IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s)	:	Tetsuya ASHIDA et al.
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For	:	INK-JET RECORDING SHEET
Art Unit	:	1774
Examiner	:	Kimberly T. Nguyen

Hon. Commissioner of Patents
and Trademarks
Washington, D.C. 20231

DECLARATION UNDER 37 CFR 1.132

S I R:

I, Yukio TOKUNAGA do declare and state as follows:

1. I am one of the joint inventors of the present U.S. Patent Application as identified above and understand the English language. I studied the Official Action dated August 28, 2002 received in said application.

2. In order to clarify the difference between the present invention and the invention of Sakaki et al. (US 5,266,383), the

following comparative experiments were conducted under my supervision.

3. Comparative experiments

Experiment

An object of this experiment is to prove that the present invention is not obvious over Sakaki et al.

<The present invention>

As a water-resistant support, a polyolefin resin-coated paper used in Example 1 mentioned on pages 20-21 was prepared. On the support, the following ink-receptive layer A was provided by coating with an amount of the fumed silica after drying being 15 g/m^2, and the layer was dried to obtain an ink-jet recording material of the present invention. Incidentally, all "part" means "parts by weight" of a solid component.

<Ink-receptive layer A>

Fumed silica (average primary particle size: 7 nm, specific surface area by BET method: 380 m^2/g)	100 parts
Basic poly(ammonium hydroxide) (Pyurakemu WT, trade name, available from K.K. Riken Green, Japan)	4 parts
Polyvinyl alcohol (PVA) (saponification degree: 88%, average polymerization degree: 3500)	20 parts
Boric acid	3 parts

As the above fumed silica, those previously dispersed by a dispersant (Shallol DC902P, trade name, available from Daiichi Kogyo Seiyaku K.K., Japan) were used.

<Comparative 1>

In the same manner as in the present invention mentioned above except for changing the fumed silica in the above-mentioned ink-receptive layer A to aluminum oxide particles (having an average primary particle size of 18 nm), a comparative sample 1 was prepared.

As the above aluminum oxide particles, those previously dispersed by a dispersant (nitric acid) were used.

<Comparative 2>

In the same manner as in the present invention mentioned above except for changing the fumed silica in the above-mentioned ink-receptive layer A to precipitated silica (having an average particle size of 12.7 μm) as silica synthesized by a wet process, a comparative sample 2 was prepared.

As the above precipitated silica, those previously dispersed by a dispersant (Shallol DC902P, trade name, available from Daiichi Kogyo Seiyaku K.K., Japan) were used.

<Comparative 3>

In the same manner as in the present invention mentioned above except for coating the ink-receptive layer A of the present invention in a total dried amount of 7 g/m^2, a comparative sample 3 was prepared.

With regard to the thus prepared four kinds of ink-jet recording materials, an ink-absorption property and glossiness were measured according to the following methods.

<Evaluation of ink-absorption property>

By using a printer PM-880C manufactured by Seiko Epson Co., Ltd., Japan, respective single colors of Y (yellow ink), M (magenta ink) and C (cyan ink) were printed with a solid color, and

immediately after the printing, a PPC paper (commercially available paper for copying) was laminated onto the printed surface and slightly pressed, and an ink amount transferred to the PPC paper was observed with naked eyes and evaluated according to the following criteria.

○: No transfer was observed.

△: Transfer was slightly admitted.

X: Transfer was admitted remarkably.

<Glossiness>

Gloss at the surface of an ink-jet recording sheet before printing was judged with naked eyes and evaluated by the following four ranks.

◎: Gloss is extremely high and good.

○: Gloss is high but slightly inferior to ◎.

△: Gloss is slightly inferior to ○.

X: Gloss is low.

The evaluation results are shown in the following table.

Recording material	Inorganic pigment	Amount (g/m^2)	Glossi-ness	Ink-absorp-tion property
Present invention	Fumed silica	15	◎	○
Comparativ e sample 1	Aluminum oxide particles	15	◎	X
Comparativ e sample 2	Silica synthesized by the wet process	15	X	○
Comparativ e sample 3	Fumed silica	7	◎	X

<Consideration>

As can be clearly seen from the above results, Comparative sample 1 which uses aluminum oxide particles described in Sakaki et al. patent shows poor ink-absorption property. Also, Com-

parative sample 2 which uses silica synthesized by the wet process and having a larger particle size show low glossiness. Moreover, in Comparative sample 3 which does not satisfy an amount of the fumed silica in the ink-receptive layer of 8 g/m2 or more of the present invention, ink-absorption property thereof was poor. To the contrary, in the ink-jet recording material of the present invention which satisfy the requirements defined in Claim 1 of the present application, both of high glossiness and excellent ink-absorption property can be obtained.

From the above results, an ink-absorption property of the ink-jet recording material according to the present invention and that of Sakaki et al. are markedly different from each other, whereby it can be clearly understood that the effects of the present invention are superior to those of Sakaki et al.

According to the above, I do not believe that the present invention is obvious over Sakaki et al., even when it is combined with the other secondary references.

4. I further declare that all statements made herein of may own knowledge are true and that all statements made in information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001, of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: January 10, 2003 By: Yukio Tokunaga
Yukio TOKUNAGA